Exposure control circuit, 73···Laser length measuring machine, 74···Distribution circuit, 75a, 75b···Buffer memory, 76···Selection circuit.

The present invention permits correction of the pattern data to be performed in the phase of preparing the pattern data. The pattern data generation and storage speed may be kept at one tenth through one hundredth the speed for reading and writing the data. So the size of the circuit can be reduced to one tenth through one hundredth that in the case where pattern data is corrected. Thus, the cost reduction achieved by the present invention provides a drastic effect.

WHAT IS CLAIMED IS:

1. A multi-electron beam exposure method comprising steps of:

writing a chip pattern on the surface of a sample by using multiple electron beams; and

exposing repeatedly the same subregions of the chip patterns of the same type exposed on the sample surface by each of the multiple electron beam.

2. A multi-electron beam exposure method according to Claim 1, wherein the data for a specified subregion of the chip pattern is kept for each of the electron beam and is read out to provide exposure repeatedly by

the number of times corresponding to the number of chips.

3. A multi-electron beam exposure method to write a chip pattern on the surface of a sample by using multiple electron beams, wherein for the surface of a sample comprising multiple stripe regions where the traveling direction of a sample stage is assumed as a Y-axis direction, said Y-axis direction is partitioned in conformity to chip width, and said stripe subregion is repeatedly exposed according to the partitioned bit map data.

4. A multi-electron beam exposure method according to Claim 3, wherein while one of said stripe regions is exposed, and the bit map data of the next stripe region is generated and saved.

5. A multi-electron beam exposure method for writing a chip pattern on the surface of a sample by using multiple electron beams, wherein when the sample surface is represented in an X-Y coordinate system and the continuous traveling direction of a sample stage is assumed as a Y-axis direction, the exposure region on the sample surface is partitioned into multiple stripe regions having a width in the X-axis direction;

each of these stripe regions is further partitioned into multiple main fields having a width

in the Y-axis direction;

at least one of the widths of the main fields in the X- and Y-axis direction is set in conformity to the chip pattern to be exposed; and

exposure is performed based on partitioned main fields as units.

6. A multi-electron beam exposure method, wherein multiple electron beams are applied to the sample surface mounted on a traveling sample stage to perform repeated exposure of chip patterns wherein when said sample surface is represented in an X-Y coordinate system and the continuous traveling direction of a sample stage is assumed as a Y-axis direction, the exposure region of the sample surface is partitioned into multiple stripe regions having a width in the X-axis direction;

each of these stripe regions is further partitioned into multiple main fields having a width in the Y-axis direction;

the width of each main field in the Y-axis direction is set to an integral submultiple of the repeated pitch of the chip pattern to be exposed in the Y-axis direction; and

each electron beam provides repeated exposure of the same subregions of said chip pattern.

7. A multi-electron beam exposure method according to Claim 6, wherein

the width of said stripe region in the X-axis direction is set to an integral submultiple of the repeated pitch of the chip pattern to be exposed in the X-axis direction; and

each electron beam provides repeated exposure of the same subregions of said chip pattern in the X-axis configuration.

8. A multi-electron beam exposure apparatus comprising:

a deflector for deflecting multiple electron beams as one integral one and blanking means for providing independent control of application of said electron beams to a sample;

a pattern generation unit for expanding compressed pattern data and generating bit map data;

a storage unit for storing the generated bit map data in a form associated with said electron beams; and

an exposure control unit for controlling said blanking mean based on the stored bit map data;

wherein said storage unit consists of a double buffer memory unit that stores the bit map data in the next exposure unit region generated by said data

generation unit, while the bit map data in the stored exposure unit region is repeatedly read out by said exposure control unit.

9. A multi-electron beam exposure apparatus according to Claim 8, wherein the bit map data of said exposure unit region is the bit map data in the chip stripe regions obtained by partitioning a repeatedly exposed pattern by the width in the scope of a main deflector.

10. A multi-electron beam exposure apparatus according to Claim 8, wherein the data generation unit for generating said bit map data contains a correction unit for correcting distortion of the second means for deflecting electron beams .

11. A multi-electron beam exposure apparatus according to Claim 9, wherein the data generation unit for generating said bit map data contains a correction unit for correcting distortion of the second means for deflecting electron beams .